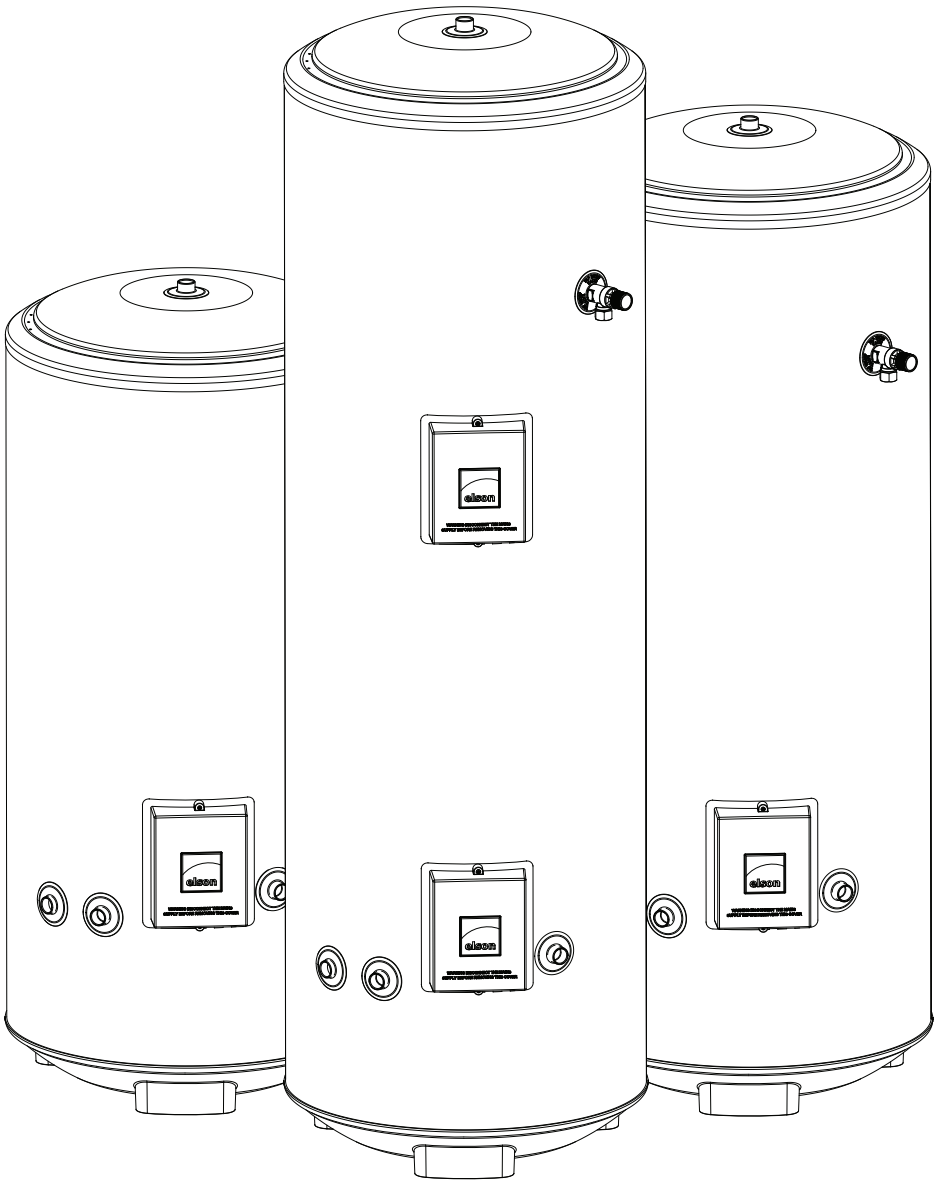
Zircon Installation Manual

Unvented Direct & Indirect Water Heaters

Installation & Servicing Instructions



Pack Contents

- Zircon unvented water heater incorporating immersion heater(s) & thermal controls
- Factory fitted temperature/pressure relief valve (set at 90°C / 1 Mpa (10bar))
- Cold water combination valve assembly
- Expansion vessel & mounting bracket
- Tundish
- 2 Port motorised valve (indirect models only)
- Compression nuts & olives
- Immersion heater spanner
- Installation & servicing instructions
- Guarantee card

IMPORTANT

Please read & understand all these instructions before commencing installation.
Please leave this manual with the customer for future reference.

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INTRODUCTION

The cylinder is a purpose designed unvented water heater. The unit has a stainless steel inner vessel, which ensures an excellent standard of corrosion resistance. The outer casing is a combination of resilient thermoplastic mouldings and plastic coated corrosion proofed steel sheet. All products are insulated with CFC free polyurethane foam to give good heat loss performance. (see Table 6, page 19)

The unit is supplied complete with all the necessary safety and control devices needed to allow connection to the cold water mains. All these components are preset and not adjustable.

This appliance complies with the requirements of the CE marking directive and is Kiwa approved to show compliance with Building Regulations (Section G3).

The following instructions are offered as a guide to installation which must be carried out by a competent plumbing and electrical installer in accordance with Building Regulation G3, The Building Standards (Scotland) Regulations 1990, or The Building Regulations (Northern Ireland).

NOTE: Prior to installation the unit should be stored in an upright position in an area free from excessive damp or humidity.

benchmark COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

THE BENCHMARK SCHEME

Benchmark places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations. The Benchmark Checklist can be used to demonstrate compliance with Building Regulations and should be provided to the customer for future reference.

Installers are required to carry out installation, commissioning and servicing work in accordance with the Benchmark Code of Practice which is available from the Heating and Hotwater Industry Council who manage and promote the Scheme. Visit www.centralheating.co.uk for more information.

IMPORTANT NOTE TO USER: PLEASE REFER TO THE USER INSTRUCTIONS SECTION ON PAGE 16 FOR IMPORTANT INFORMATION WITH RESPECT TO THE BENCHMARK SCHEME

kiwa approved product UK BUILDING REGULATIONS
kiwa approved product UK WATER SUPPLY REGULATIONS
BEAB Approved
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GENERAL REQUIREMENTS

IMPORTANT:

THIS APPLIANCE IS NOT INTENDED FOR THE USE BY PERSONS (INCLUDING CHILDREN) WITH REDUCED PHYSICAL, SENSORY OR MENTAL CAPABILITIES, OR LACK OF KNOWLEDGE AND EXPERIENCE, UNLESS THEY HAVE BEEN GIVEN SUPERVISION OR INSTRUCTION CONCERNING THE USE OF THE APPLIANCE BY A PERSON RESPONSIBLE FOR THEIR SAFETY.

CHILDREN MUST BE SUPERVISED TO ENSURE THEY DO NOT PLAY WITH THE APPLIANCE.

SITING THE UNIT

The cylinder must be vertically floor mounted. Although location is not critical, the following points should be considered:

- The cylinder should be sited to ensure minimum dead leg distances, particularly to the point of most frequent use.
- Avoid siting where extreme cold temperatures will be experienced. All exposed pipe work should be insulated.
- The discharge pipework from the safety valves must have minimum fall of 1:200 from the unit and terminate in a safe and visible position.
- Access to associated controls and immersion heaters must be available to provide for the servicing and maintenance of the system. Where these controls are installed against a wall a minimum distance of 250mm must be left (see Fig. 1).
- Ensure that the floor area for the cylinder is level and capable of permanently supporting the weight when full of water. (see Table 1)

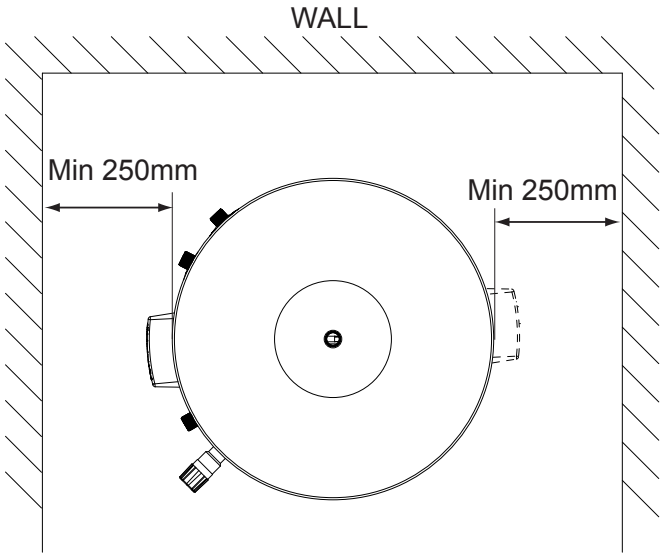


Fig. 1: Siting the Unit

Type	Model Reference	Nominal Capacity (litres)	Weight of unit full (Kg)	Weight of unit (Kg)
Indirect	120zi	120	147	27
	150zi	150	182	32
	170zi	170	204	34
	210zi	210	250	40
	250zi	250	294	44
	300zi	300	352	52
Direct	120zd	120	144	24
	150zd	150	178	28
	170zd	170	201	31
	210zd	210	247	37
	250zd	250	289	39
	300zd	300	349	49

Table 1: Unit weights

WATER SUPPLY

Bear in mind that the mains water supply to the property will be supplying both the hot and cold water requirements simultaneously.

It is recommended that the maximum water demand is assessed and the water supply checked to ensure this demand can be satisfactorily met.

Note: A high mains water pressure will not always guarantee high flow rates.

Wherever possible the mains supply pipe should be 22mm. We suggest the minimum supply requirements should be 0.15MPa (1.5 bar) pressure and 20 litres per minute flowrate. However, at these values outlet flow rates may be poor if several outlets are used simultaneously. The higher the available pressure and flow rate the better the system performance.

The cylinder has an operating pressure of 0.35MPa (3.5 bar) which is controlled by the cold water combination valve assembly. The cold water combination valve assembly can be connected to a maximum mains pressure of 1.6MPa (16 bar).

OUTLET/TERMINAL FITTINGS (TAPS, ETC.)

The cylinder can be used with most types of terminal fittings. It is advantageous in many mixer showers to have balanced hot and cold water supplies. In these instances a balanced pressure cold water connection should be placed between the 2 pieces of the cold water combination valve assembly (see Fig. 2). Outlets situated higher than the cylinder will give outlet pressures lower than that at the heater, a 10m height difference will result in a 0.1MPa (1 bar) pressure reduction at the outlet. All fittings, pipework and connections must have a rated pressure of at least 0.6MPa (6 bar) at 80°C.

LIMITATIONS

The cylinder should not be used in association with any of the following:

- Solid fuel boilers or any other boiler in which the energy input is not under effective thermostatic control, unless additional and appropriate safety measures are installed.
- Ascending spray type bidets or any other class 1 back syphonage risk requiring that a type A air gap be employed.
- Steam heating plants unless additional and appropriate safety devices are installed.
- Situations where maintenance is likely to be neglected or safety devices tampered with.
- Water supplies that have either inadequate pressure or where the supply may be intermittent.
- Situations where it is not possible to safely pipe away any discharge from the safety valves.
- In areas where the water consistently contains a high proportion of solids, e.g. suspended matter that could block the strainer, unless adequate filtration can be ensured.
- In areas where the water supply contains chloride levels that exceed 250mg/l.

OPERATIONAL SUMMARY

Maximum mains pressure	1.6MPa (16 bar)
Operating pressure	0.35MPa (3.5 bar)
Maximum design pressure	0.6MPa (6 bar)
Expansion vessel charge pressure	0.35MPa (3.5 bar)
Expansion relief valve setting	0.6MPa (6 bar)
T&P relief valve setting	90-95°C/1.0MPa (10 bar)
Maximum primary circuit pressure (indirect only)	1.0MPa (10 bar)
Pressure drop (Primary coil)	0.02MPa (0.2 bar)
Storage capacity	see Table 1
Weight when full	see Table 1

Indirect Models in conformance with BS EN 12897:2006

INSTALLATION GENERAL

PIPE FITTINGS

All pipe fittings are made via 22mm compression fittings directly to the unit. The fittings are threaded 3/4"BSP male parallel, should threaded pipe connections be required.

COLD FEED

A 22mm cold water supply is recommended, however, if a 15mm (1/2") supply exists, which provides sufficient flow, this may be used (although more flow noise may be experienced).

A stopcock or servicing valve should be incorporated into the cold water supply to enable the cylinder and its associated controls to be isolated and serviced.

COLD WATER COMBINATION VALVE ASSEMBLY

The 2-piece cold water combination valve assembly (see Fig. 2) can be located anywhere on the cold water mains supply prior to the expansion vessel (see Fig. 6 Page 10) but the two pieces do not have to be installed together.

The pressure reducing valve incorporates the pressure reducer and strainer and the expansion valve incorporates the expansion and check valves. Ensure that the valves are installed in the correct order and orientation. No other valves should be placed between the expansion valve and the cylinder. A connection can be made between the expansion and pressure reducing valves to provide a balanced cold water connection. The expansion valve connection must not be used for any other purpose.

DRAIN TAP

A suitable draining tap should be installed in the cold water supply to the cylinder between the expansion valve (see Fig. 6 Page 10) and the heater at as low a level as possible. It is recommended that the outlet point of the drain pipework be at least 1 metre below the level of the heater (this can be achieved by attaching a hose to the drain tap outlet spigot).

EXPANSION VESSEL

The expansion vessel accommodates expansion that results from heating the water inside the unit. The expansion vessel is pre-charged at 0.35MPa (3.5 bar). The expansion vessel must be connected between the expansion valve and the cylinder (see Fig. 6 Page 10). The location of the expansion vessel should allow access to recharge the pressure as and when necessary, this can be done using a normal car foot pump. It is recommended that the expansion vessel is adequately supported. An expansion vessel wall mounting bracket is supplied for this purpose and should be fitted.

SECONDARY CIRCULATION

If secondary circulation is required it is recommended that it be connected to the cylinder as shown (see Fig. 3 page 5) via a swept tee joint into the cold feed to the unit. A swept tee joint is available as an accessory (order code no. 5133565).

The secondary return pipe should be in 15mm pipe and incorporate a check valve to prevent backflow. A suitable WRAS approved bronze circulation pump will be required. On large systems, due to the increase in system water content, it may be necessary to fit an additional expansion vessel to the secondary circuit. This should be done if the capacity of the secondary circuit exceeds 10 litres.

Pipe capacity (copper):

15mm O.D. = 0.13 l/m (10 litres = 77m)

22mm O.D. = 0.38 l/m (10 litres = 26m)

28mm O.D. = 0.55 l/m (10 litres = 18m)

NOTE: Secondary circulation is NOT recommended for direct electric units.

OUTLET

The hot water outlet is a 22mm compression fitting located at the top of the cylinder. Hot water distribution pipework should be 22mm pipe with short runs of 15mm pipe to terminal fittings such as sinks and basins. Pipe sizes may vary due to system design.

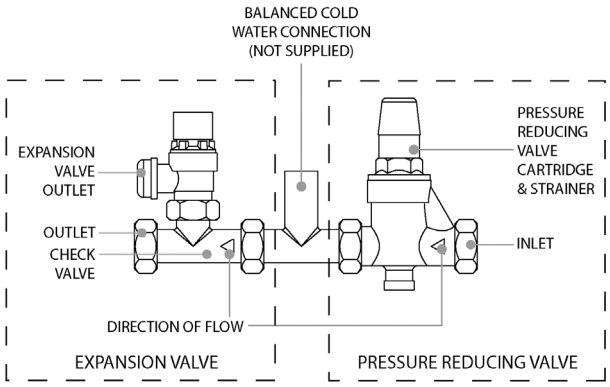


Fig. 2: Cold water combination valve assembly

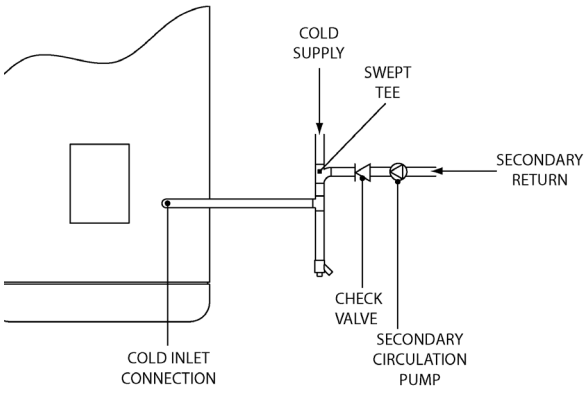


Fig. 3: Secondary circulation connection

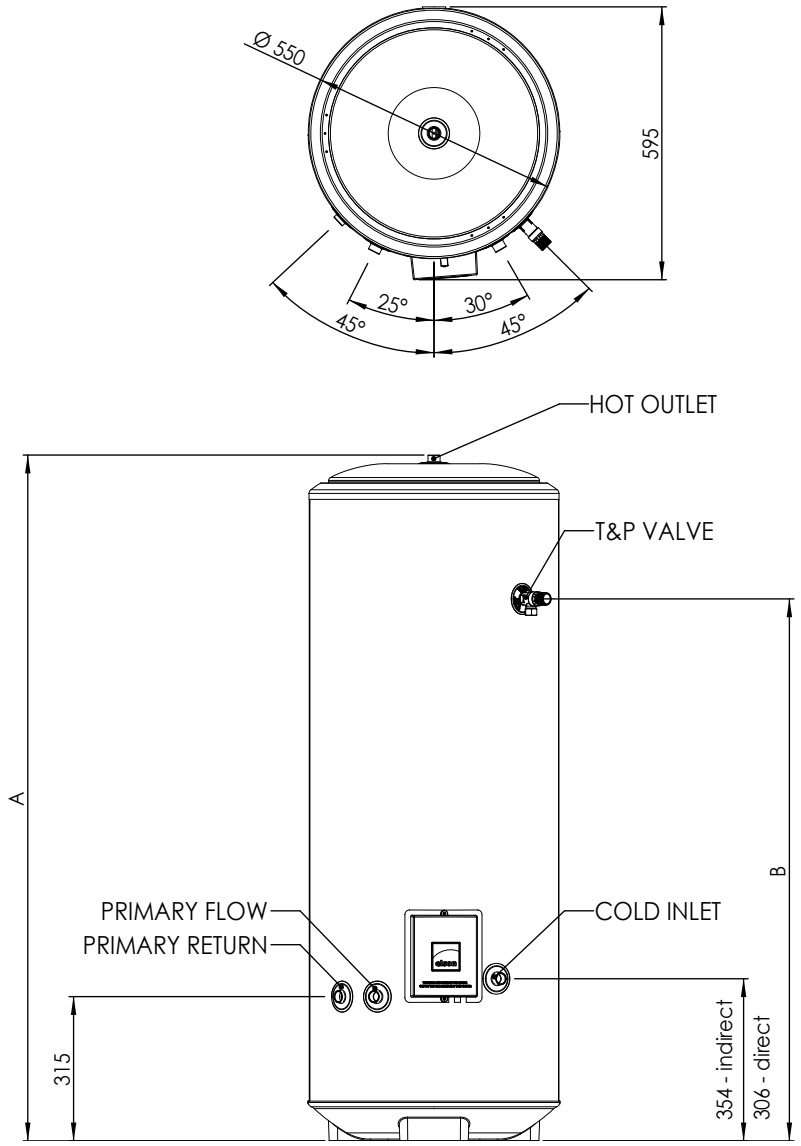


Fig. 4 General dimensions

Type	Model Reference	Dimensions (mm)		Primary Flow (ltrs/min @80°C +/- 2°C)	Coil Rating (kW)	Heat-up Time (mins)	Hot Water Capacity (ltrs) (volume of water drawn off >40°C)
		A	B				
Indirect	120zi	930	615	15	12.5	29	104
	150zi	1114	800	15	12.5	37	138.5
	170zi	1240	925	15	15	35	156.5
	210zi	1498	1184	15	15	43	196
	250zi	1752	1378	15	18	43	227
	300zi	2067	1693	15	19	49	242.5
Direct	120zd	930	615			121	104
	150zd	1114	800			152	138.5
	170zd	1240	925			173	156.5
	210zd	1498	1184			215	196
	250zd	1752	1378			257	227
	300zd	2067	1693			310	242.5

Table 2: Dimensions and performance

Notes:

1. Indirect cylinders tested in conformance with BS EN 12897:2006
2. Heat up time from cold through 45°C, with a primary flow rate 15ltrs/min at 80°C +/- 2°C.
3. Direct heating times assume use of lower element only, from cold, through 45°C.

INSTALLATION DISCHARGE

DISCHARGE PIPEWORK

It is a requirement of Building Regulation G3 that any discharge from an unvented system is conveyed to where it is visible, but will not cause danger to persons in or about the building. The tundish and discharge pipes should be fitted in accordance with the requirements and guidance notes of Building Regulation G3. The G3 Requirements and Guidance section 3.50 - 3.63 are reproduced in the following sections of this manual. For discharge pipe arrangements not covered by G3 Guidance advice should be sought from your local Building Control Officer. Any discharge pipe connected to the pressure relief devices (Expansion Valve and Temperature/Pressure Relief Valve) must be installed in a continuously downward direction and in a frost free environment.

Water may drip from the discharge pipe of the pressure relief device. This pipe must be left open to the atmosphere. The pressure relief device is to be operated regularly to remove lime deposits and to verify that it is not blocked.

G3 REQUIREMENT

"...there shall be precautions...to ensure that the hot water discharged from safety devices is safely conveyed to where it is visible but will not cause danger to persons in or about the building."

The following extract is taken from the latest G3 Regulations

Discharge pipes from safety devices

Discharge pipe D1

3.50 Each of the temperature relief valves or combined temperature and pressure relief valves specified in 3.13 or 3.17 should discharge either directly or by way of a manifold via a short length of metal pipe (D1) to a tundish.

3.51 The diameter of discharge pipe (D1) should be not less than the nominal outlet size of the temperature relief valve.

3.52 Where a manifold is used it should be sized to accept and discharge the total discharge form the discharge pipes connected to it.

3.53 Where valves other than the temperature and pressure relief valve from a single unvented hot water system discharge by way of the same manifold that is used by the safety devices, the manifold should be factory fitted as part of the hot water storage system unit or package.

Tundish

3.54 The tundish should be vertical, located in the same space as the unvented hot water storage system and be fitted as close as possible to, and lower than, the valve, with no more than 600mm of pipe between the valve outlet and the tundish (see Diagram 1).

Note: To comply with the Water Supply (Water Fittings) Regulations, the tundish should incorporate a suitable air gap.

3.55 Any discharge should be visible at the tundish. In addition, where discharges from safety devices may not be apparent, e.g. in dwellings occupied by people with impaired vision or mobility, consideration should be given to the installation of a suitable safety device to warn when discharge takes place, e.g. electronically operated.

Discharge pipe D2

3.56 The discharge pipe (D2) from the tundish should:

(a) have a vertical section of pipe at least 300mm long below the tundish before any elbows or bends in the pipework (see Fig. 5); and
(b) be installed with a continuous fall thereafter of at least 1 in 200.

3.57 The discharge pipe (D2) should be made of:
(a) metal; or
(b) other material that has been demonstrated to be capable of safely withstanding temperatures of the water discharged and is clearly and permanently marked to identify the product and performance standard (e.g. as specified in the relevant part of BS 7291).

3.58 The discharge pipe (D2) should be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9m long, i.e. for discharge pipes between 9m and 18m the equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device; between 18 and 27m at least 3 sizes larger, and so on; bends must be taken into account in calculating the flow resistance. See Fig 1, Table 3 and the worked example.

Note: An alternative approach for sizing discharge pipes would be to follow Annex D, section D.2 of BS 6700:2006 Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.

3.59 Where a single common discharge pipe serves more than one system, it should be at least one pipe size larger than the largest individual discharge pipe (D2) to be connected.

3.60 The discharge pipe should not be connected to a soil discharge stack unless it can be demonstrated that the soil discharge stack is capable of safely withstanding temperatures of the water discharged, in which case, it should:

(a) contain a mechanical seal, not incorporating a water trap, which allows water into the branch pipe without allowing foul air from the drain to be ventilated through the tundish;
(b) be a separate branch pipe with no sanitary appliances connected to it;
(c) if plastic pipes are used as branch pipes carrying discharge from a safety device they should be either polybutalene (PB) to Class S of BS 7291-2:2006 or cross linked polyethylene (PE-X) to Class S of BS 7291-3:2006; and
(d) be continuously marked with a warning that no sanitary appliances should be connected to the pipe.

Note:

1. Plastic pipes should be joined and assembled with fittings appropriate to the circumstances in which they are used as set out in BS EN ISO 1043-1.
2. Where pipes cannot be connected to the stack it may be possible to route a dedicated pipe alongside or in close proximity to the discharge stack.

Termination of discharge pipe

3.61 The discharge pipe (D2) from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge.

3.62 Examples of acceptable discharge arrangements are:

(a) to a trapped gully with the end of the pipe below a fixed grating and above the water seal;
(b) downward discharges at low level; i.e. up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility; and
(c) discharges at high level: e.g. into a metal hopper and metal downpipe with the end of the discharge pipe clearly visible or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastic guttering system that would collect such discharges.

3.63 The discharge would consist of high temperature water and steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges.

Worked example of discharge pipe sizing

Fig. 5: shows a G1/2 temperature relief valve with a discharge pipe (D2) having 4 No. elbows and length of 7m from the tundish to the point of discharge.

From Table 3:
Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from a G1/2 temperature relief valve is 9.0m.
Subtract the resistance for 4 No. 22mm elbows at 0.8m each = 3.2m

Therefore the permitted length equates to: 5.8m

5.8m is less than the actual length of 7m therefore calculate the next largest size.

Maximum resistance allowed for a straight length of 28mm pipe (D2) from a G1/2 temperature relief valves equates to 18m.
Subtract the resistance of 4 No. 28mm elbows at 1.0m each = 4.0m

Therefore the maximum permitted length equates to: 14m

As the actual length is 7m, a 28mm (D2) copper pipe will be satisfactory.

WARNINGS:

- Under no circumstances should the factory fitted temperature/pressure relief valve be removed other than by a competent person. To do so will invalidate any guarantee or claim.
- The cold water combination valve assembly must be fitted on the mains water supply to the cylinder.
- No control or safety valves should be tampered with or used for any other purpose.
- The discharge pipe should not be blocked or used for any other purpose.
- The tundish should not be located adjacent to any electrical components.

VALVE OUTLET SIZE	MINIMUM SIZE OF DISCHARGE PIPE D1	MINIMUM SIZE OF DISCHARGE PIPE D2 FROM TUNDISH	MAXIMUM RESISTANCE ALLOWED, EXPRESSED AS A LENGTH OF STRAIGHT PIPE (I.E. NO ELBOWS OR BENDS	RESISTANCE CREATED BY EACH ELBOW OR BEND
G 1/2	15MM	22mm 28mm 35mm	UP TO 9M UP TO 18M UP TO 27M	0.8M 1.0M 1.4M
G 3/4	22MM	28mm 35mm 42mm	UP TO 9M UP TO 18M UP TO 27M	1.0M 1.4M 1.7M
G 1	28MM	35mm 42mm 54mm	UP TO 9M UP TO 18M UP TO 27M	1.4M 1.7M 2.3M

Table 3: Sizing of copper discharge pipe (D2) for common temperature relief valve outlet sizes
NOTE: The above table is based on copper tube. Plastic pipes may be of different bore and resistance. Sizes and maximum lengths of plastic should be calculated using data prepared for the type of pipe being used.

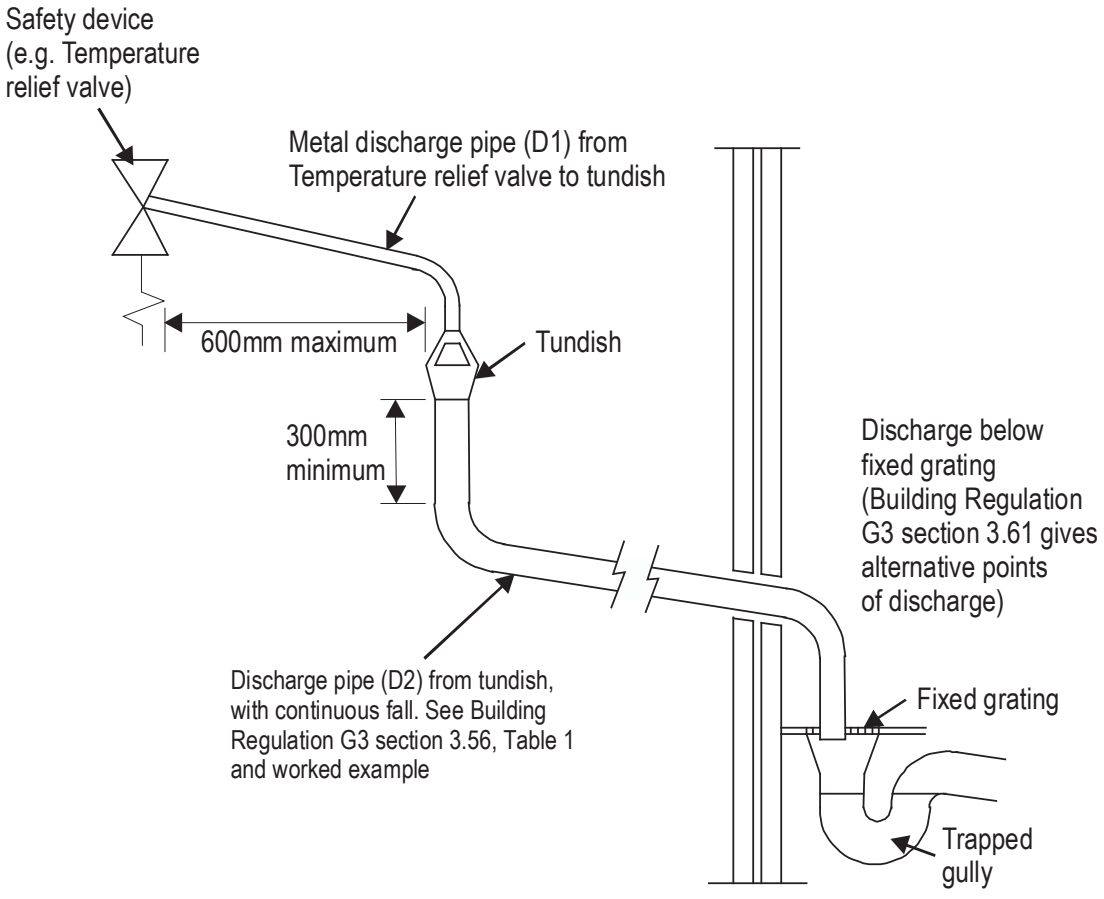


Fig. 5: Typical discharge pipe arrangement (extract from Building Regulation G3 Guidance section 3.50)

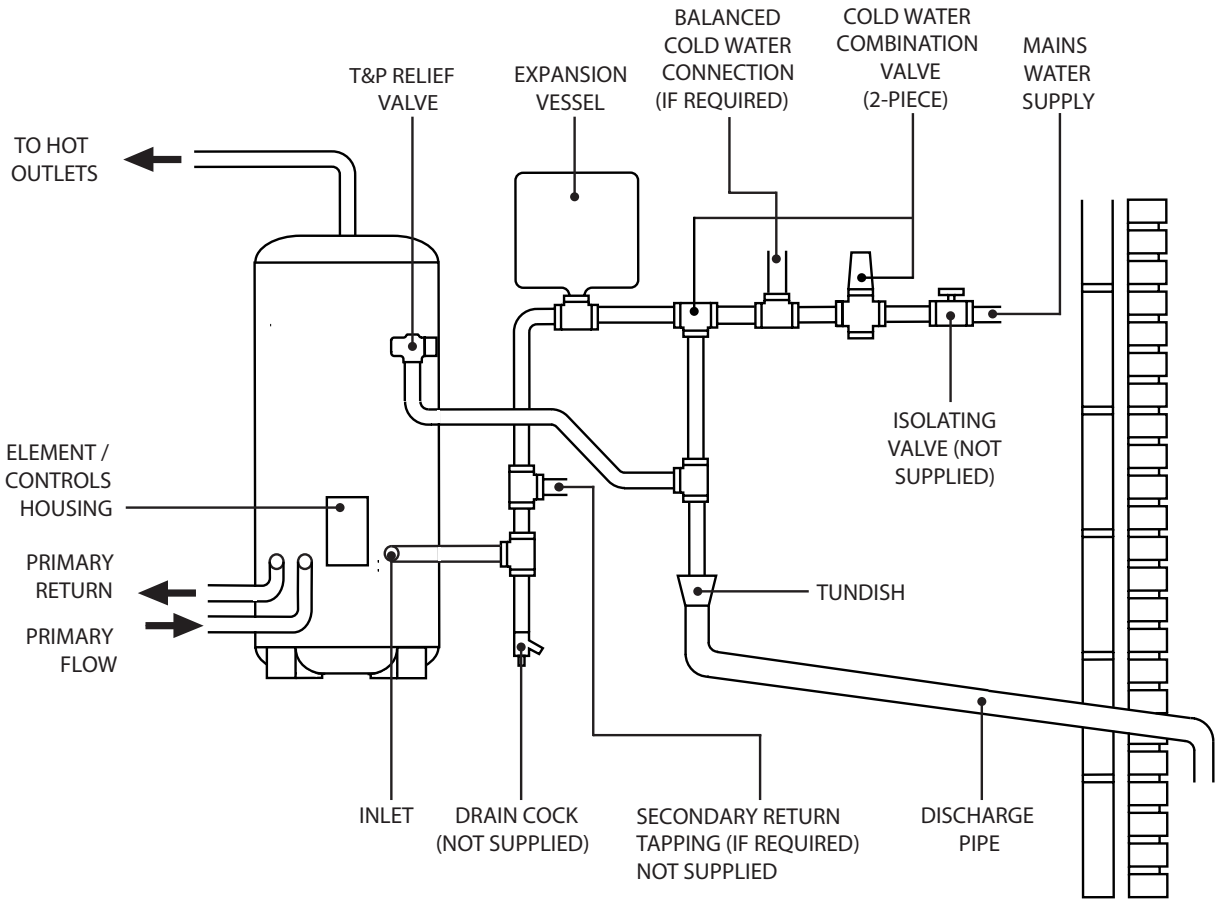


Fig. 6: Typical installation - schematic

INSTALLATION - DIRECT

SAFETY

DISCONNECT FROM THE MAINS ELECTRICAL SUPPLY BEFORE REMOVING ANY COVERS. Never attempt to replace the immersion heater(s) other than with the recommended immersion heater(s).

DO NOT BYPASS THE THERMAL CUT-OUT(S) IN ANY CIRCUMSTANCES. Ensure the two male spade terminations on the underside of the combined thermostat and thermal cut-out are pushed firmly onto the corresponding terminations on the element plate assembly.

In case of difficulty contact service support; contact details available at the back of this booklet.

ELECTRICAL SUPPLY

All electrical wiring should be carried out by a competent electrician and be in accordance with the latest I.E.E Wiring Regulations.

Each circuit must be protected by a suitable fuse and double pole isolating switch with a contact separation of at least 3mm in both poles.

The immersion heater(s) should be wired in accordance with Fig 7. The immersion heaters MUST be earthed. The supply cable should be 1.5mm² 3 core HOFR sheathed and must be routed through the cable grip provided with the outer sheath of the cable firmly secured by tightening the screws on the cable grip.

DO NOT operate the immersion heaters until the cylinder has been filled with water.

Ensure the thermostat and thermal cut-out sensing bulbs are pushed fully into the pockets on the element plate assembly.

PLUMBING CONNECTIONS

Direct cylinders require the following pipework connections.

- Cold water supply to and from inlet controls.
- Outlet to hot water draw off points.
- Discharge pipework from valve outlets to tundish.

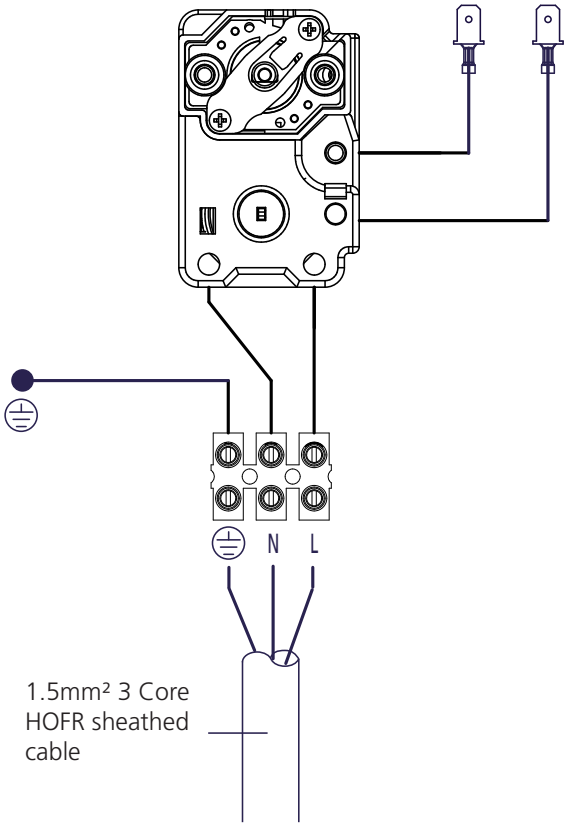


Fig. 7: Electrical connections (direct schematic)

INSTALLATION - INDIRECT

SAFETY

DISCONNECT FROM THE MAINS ELECTRICAL SUPPLY BEFORE REMOVING ANY COVERS. Never attempt to replace the immersion heater(s) other than with the recommended authorised immersion heater(s).

DO NOT BYPASS THE THERMAL CUT-OUT(S) IN ANY CIRCUMSTANCES. Ensure the two male spade terminations on the underside of the combined thermostat and thermal cut-out are pushed firmly onto the corresponding terminations on the element plate assembly.

In case of difficulty contact service support; contact details available at the back of this booklet.

ELECTRICAL SUPPLY

All electrical wiring should be carried out by a competent electrician and be in accordance with the latest I.E.E Wiring Regulations.

Each circuit must be protected by a suitable fuse and double pole isolating switch with a contact separation of at least 3mm in both poles.

The immersion heater(s) should be wired in accordance with Fig 8. The immersion heaters MUST be earthed. The supply cable should be 1.5mm^2 3 core HOFR sheathed and must be routed through the cable grip provided with the outer sheath of the cable firmly secured by tightening the screws on the cable grip.

DO NOT operate the immersion heaters until the cylinder has been filled with water.

Ensure the thermostat and thermal cut-out sensing bulbs are pushed fully into the pockets on the element plate assembly.

PLUMBING CONNECTIONS

Indirect cylinders require the following pipework connections.

- Cold water supply to and from inlet controls.
- Outlet to hot water draw off points.
- Discharge pipework from valve outlets to tundish.
- Connection to the primary circuit.

All connections are 22mm compression. However, 3/4”BSP parallel threaded fittings can be fitted to the primary coil connections if required.

BOILER SELECTION

The boiler should have a control thermostat and non self-resetting thermal cut-out and be compatible with unvented storage water heaters.

Where use of a boiler without a thermal cut-out is unavoidable a “low head” open vented primary circuit should be used. The feed and expansion cistern head above the cylinder should not exceed 2.5m.

PRIMARY CIRCUIT CONTROL

The 2 port motorised valve supplied with the cylinder MUST be fitted on the primary flow to the cylinder heat exchanger and wired in series with the indirect control thermostat and thermal cut-out fitted to the unit.

Primary circulation to the cylinder heat exchanger must be pumped; gravity circulation WILL NOT WORK.

SPACE AND HEATING SYSTEMS CONTROLS

The controls provided with the cylinder will ensure the safe operation of the unit within the central heating system. Other controls will be necessary to control the space heating requirements and times that the system is required to function, see Fig. 8 below.

The cylinder is compatible with most heating controls, examples of electrical circuits are shown in Figs. 9 and 10 (Page 13). However, other systems may be suitable, refer to the controls manufacturers’ instructions, supplied with the controls selected, for alternative system wiring schemes.

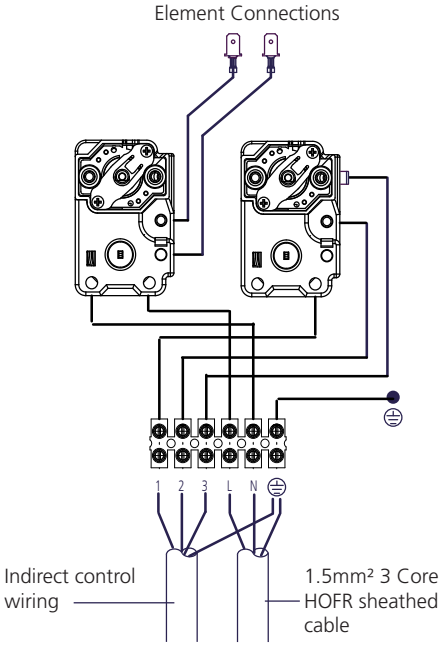
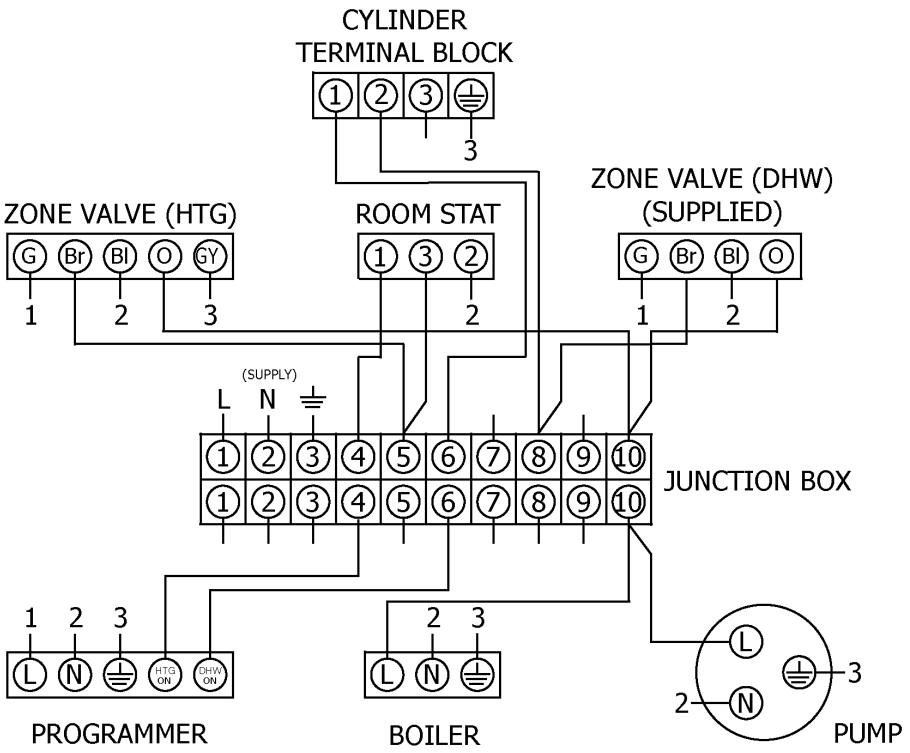
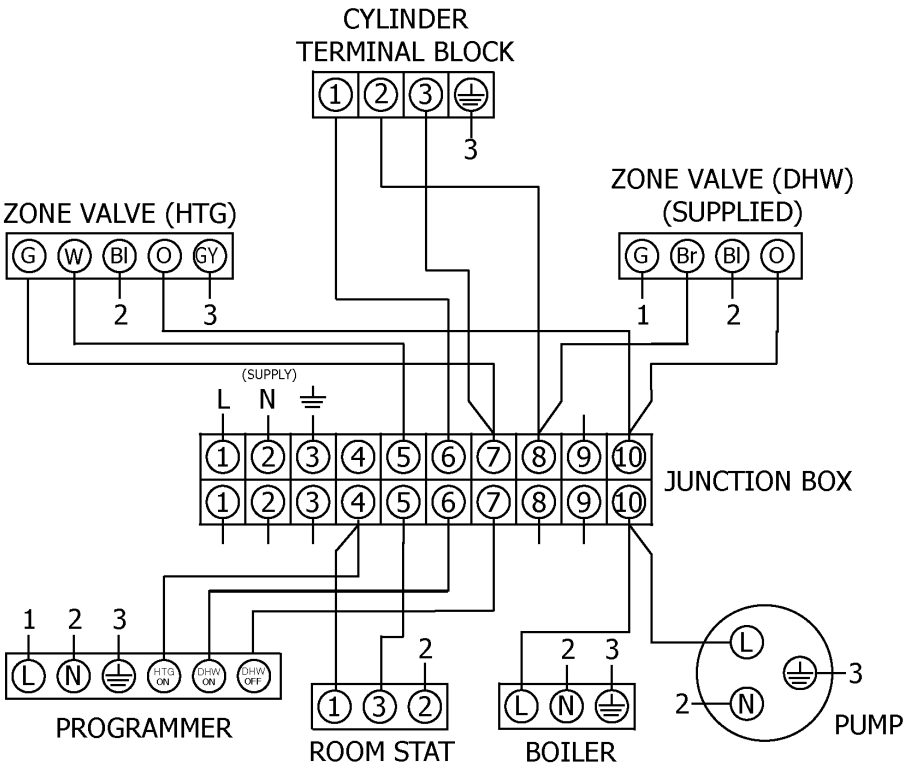


Fig. 8: Electrical connections (indirect schematic)



NOTES:
CONTROL TERMINAL NUMBERING MAY DIFFER FROM THOSE SHOWN.
REFER TO INSTRUCTIONS WITH CONTROLS SELECTED.
A DOUBLE POLE ISOLATING SWITCH MUST BE INSTALLED IN THE MAINS SUPPLY.
ALL EARTH CONNECTIONS MUST BE CONNECTED BACK TO THE MAINS EARTH SUPPLY.

Fig. 9: Schematic wiring diagram - Basic 2 x 2 port valve system



NOTES:
CONTROL TERMINAL NUMBERING MAY DIFFER FROM THOSE SHOWN.
REFER TO INSTRUCTIONS WITH CONTROLS SELECTED.
A DOUBLE POLE ISOLATING SWITCH MUST BE INSTALLED IN THE MAINS SUPPLY.
ALL EARTH CONNECTIONS MUST BE CONNECTED BACK TO THE MAINS EARTH SUPPLY.

Fig. 10: Schematic wiring diagram - 3 port mid position valve system. N.B. Must be used in conjunction with 2 port zone valve supplied

COMMISSIONING

FILLING THE UNIT WITH WATER

Ensure that all fittings and immersion heaters are correctly fitted and tightened. An immersion heater key is provided to aid tightening the immersion heater(s)

- Check expansion vessel pre-charge pressure The vessel is supplied precharged to 0.35MPa (3.5 bar) to match the control pressure of the pressure reducing valve. The precharge pressure is checked using a car tyre gauge by unscrewing the plastic cap opposite the water connection.
- Check all connections for tightness including the immersion heater(s). An immersion heater key spanner is supplied for this purpose.
- Ensure the drain cock is CLOSED.
- Open a hot tap furthest from the cylinder.
- Open the mains stop cock to fill the unit. When water flows from the tap, allow to run for a few minutes to thoroughly flush through any residue, dirt or swarf, then close the tap.
- Open successive hot taps to purge the system of air.

SYSTEM CHECKS

- Check all water connections for leaks and rectify as necessary.
- Turn off mains water supply.
- Remove the pressure reducing valve head work to access the strainer mesh, clean and re-fit.
- Manually open, for a few seconds, each relief valve in turn, checking that water is discharged and runs freely through the tundish and out at the discharge point.
- Ensure that the valve(s) reseat satisfactorily.

DIRECT UNITS

Switch on electrical supply to the immersion heater(s) and allow the cylinder to heat up to normal working temperature (60°C recommended, approximately graduation 4 on the thermostat). If necessary the temperature can be adjusted by inserting a flat bladed screwdriver in the adjustment knob on top of the immersion heater thermostat and rotating. The adjustment range 1 to 5 represents a temperature range of 12°C to 68°C. Check the operation of thermostat(s) and that no water has issued from the expansion relief valve or temperature/pressure relief valve during the heating cycle.

INDIRECT UNITS

Fill the indirect (primary) circuit following the boiler manufacturer's commissioning instructions. To ensure the cylinder primary heat exchanger is filled, the 2 port motorised valve (supplied) should be manually opened by moving the lever on the motor housing to the MANUAL setting. When the primary circuit is full return the lever to the AUTOMATIC position.

Switch on the boiler, ensure the programmer is set to Domestic Hot Water and allow the cylinder to heat up to a normal working temperature (60°C recommended, approximately graduation 4 on the thermostat). If necessary the temperature can be adjusted by inserting a flat bladed screwdriver in the adjustment knob and rotating. The minimum thermostat setting is 12°C.

The adjustment range 1 to 5 represents a temperature range of 12°C to 68°C.

Check the operation of the indirect thermostat and 2 port motorised valve and that no water has issued from the expansion relief valve or temperature/ pressure relief valve during the heating cycle.

BENCHMARK LOG BOOK

On completion of the installation and commissioning procedures detailed in this manual the Benchmark "Installation, Commissioning and Service Record Log, pages 22 and 23 should be completed and signed off by the competent installer or commissioning engineer in the relevant sections. The various system features, location of system controls, user instructions and what to do in the event of a system failure should be explained to the customer. The customer should then countersign the Benchmark™ commissioning checklist (page 22) to accept completion. The Service Record should be filled in when any subsequent service or maintenance operation is carried out on the product.

MAINTENANCE

MAINTENANCE REQUIREMENTS

Unvented hot water systems have a continuing maintenance requirement in order to ensure safe working and optimum performance. It is essential that the relief valve(s) are periodically inspected and manually opened to ensure no blockage has occurred in the valves or discharge pipework. Similarly cleaning of the strainer element and replacement of the air in the expansion vessel will help to prevent possible operational faults.

The maintenance checks described below should be performed by a competent person on a regular basis, e.g. annually to coincide with boiler maintenance.

After any maintenance, please complete the relevant Service Interval Record section of the Benchmark Checklist on Page 22 of this document.

INSPECTION

The immersion heater boss can be used as an access for inspecting the cylinder internally.

SAFETY VALVE OPERATION

Manually operate the temperature/pressure relief valve for a few seconds. Check water is discharged and that it flows freely through the tundish and discharge pipework. Check valve reseats correctly when released. NOTE: Water discharged may be very hot!

Repeat the above procedure for the Expansion Relief Valve.

STRAINER

Turn off the cold water supply, boiler and immersion heaters. The lowest hot water tap should then be opened to de-pressurise the system. Remove the pressure reducing cartridge to access the strainer mesh. Wash any particulate matter from the strainer under clean water. Re-assemble ensuring the seal is correctly fitted. DO NOT use any other type of sealant.

DESCALING IMMERSION HEATER(S)

Before removing the immersion heater(s) the unit must be drained. Ensure the water, electrical supply and boiler are OFF before draining. Attach a hosepipe to the drain cock having sufficient length to take water to a suitable discharge point below the level of the unit. Open a hot tap close to the unit and open drain cock to drain unit.

DIRECT UNITS

Switch on electrical supply to the immersion heater(s) and allow to heat up to normal working temperature (60ºC recommended, approximately graduation 4 on the thermostat). If necessary the temperature can be adjusted by inserting a flat bladed screwdriver in the adjustment knob on top of the immersion heater thermostat and rotating.

The adjustment range 1 to 5 represents a temperature range of 12°C to 68°C. Check the operation of thermostat(s) and that no water has issued from the expansion relief valve or temperature/pressure relief valve during the heating cycle.

INDIRECT UNITS

Open the cover(s) to the immersion heater housing(s) and disconnect wiring from immersion heater(s) thermostat(s). Remove thermostat by carefully pulling outwards. Remove thermostat capillary sensors from the pockets on the immersion heater. Unscrew immersion heater backnut(s) and remove immersion heater from the unit. A key spanner is supplied with the cylinder unit for easy removal/tightening of the immersion heater(s). Over time the immersion heater gasket may become stuck to the mating surface. To break the seal insert a round bladed screwdriver into one of the pockets on the immersion heater and gently lever up and down.

Carefully remove any scale from the surface of the element(s). DO NOT use a sharp implement as damage to the element surface could be caused. Ensure sealing surfaces are clean and seals are undamaged, if in doubt fit a new gasket (part number 95 611 822).

Replace immersion heater(s) ensuring the lower (right angled) element hangs vertically downwards towards the base of the unit. It may be helpful to support the immersion heater using a round bladed screwdriver inserted into one of the thermostat pockets whilst the backnut is tightened. Replace thermostat capillaries into pocket. Replace the immersion heater thermostat by carefully plugging the two male spade terminations on the underside of the thermostat head into the corresponding terminations on the element. Rewire, check, close and secure immersion heater housing cover(s).

EXPANSION VESSEL CHARGE PRESSURE

Remove the dust cap on top of the vessel. Check the charge pressure using a tyre pressure gauge. The pressure (with system de-pressurised) should be 0.35MPa (3.5 bar). If it is lower than the required setting it should be re-charged using a tyre pump (Schrader valve type). DO NOT OVER-CHARGE. Re-check the pressure and when correct replace the dust cap.

RE-COMMISSIONING

Check all electrical and plumbing connections are secure. Close the drain cock. With a hot tap open, turn on the cold water supply and allow unit to refill. DO NOT switch on the immersion heater(s) or boiler until the unit is full. When water flows from the hot tap allow to flow for a short while to purge air and flush through any disturbed particles. Close hot tap and then open successive hot taps in system to purge any air. When completely full and purged check system for leaks. The heating source (immersion heater(s) or boiler) can then be switched on.

USER INSTRUCTIONS

WARNINGS

IF WATER DISCHARGES FROM THE TEMPERATURE/PRESSURE RELIEF VALVE ON CYLINDER SHUT DOWN THE BOILER. DO NOT TURN OFF ANY WATER SUPPLY. CONTACT A COMPETENT INSTALLER FOR UNVENTED WATER HEATERS TO CHECK THE SYSTEM.

DO NOT TAMPER WITH ANY OF THE SAFETY VALVES FITTED TO THE SYSTEM. IF A FAULT IS SUSPECTED CONTACT A COMPETENT INSTALLER.

BENCHMARK

The cylinder is covered by the Benchmark Scheme which aims to improve the standards of installation and commissioning of domestic heating and hot water systems in the UK and to encourage regular servicing to optimise safety, efficiency and performance.

Benchmark is managed and promoted by the Heating and Hotwater Industry Council. For more information visit www.centralheating.co.uk.

Please ensure that the installer has fully completed the Benchmark Checklist (Page 22 & 23) of this manual and that you have signed it to say that you have received a full and clear explanation of its operation. The installer is legally required to complete a commissioning checklist as a means of complying with the appropriate Building Regulations (England & Wales).

All installations must be notified to Local Area Building Control either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer who should, on receipt, write the Notification Number on the Benchmark Checklist.

This product should be serviced regularly to optimise its safety, efficiency and performance. The service engineer should complete the relevant Service Record on the Benchmark Checklist after each service.

The Benchmark Checklist may be required in the event of any warranty work and as supporting documentation relating to home improvements in the optional documents section of the Home Improvements Pack.

FLOW PERFORMANCE

When initially opening hot outlets a small surge in flow may be noticed as pressures stabilise. This is quite normal with unvented systems. In some areas cloudiness may be noticed in the hot water. This is due to aeration of the water, is quite normal and will quickly clear.

TEMPERATURE CONTROLS – DIRECT UNITS IMMERSION HEATER(S)

A combined adjustable thermostat and thermal cut-out is provided for each immersion heater. The thermostat is factory set to give a water storage temperature of approx. 55°C to 60°C. Access to the thermostat can be made by opening the immersion heater cover - DISCONNECT THE ELECTRICAL SUPPLY BEFORE OPENING THE COVER(S). Temperature adjustment is made by inserting a flat bladed screwdriver in the slot on the adjustment disc on top of the thermostat and rotating. The adjustment range 1 to 5 represents a temperature range of 12°C to 68°C (60°C will be approximately position 4). If in any doubt contact a competent electrician.

DO NOT bypass the thermal cut-out(s) in any circumstances.

TEMPERATURE CONTROLS - INDIRECT UNITS

The cylinder units are fitted with an indirect thermostat and thermal cut-out. These controls must be wired in series with the 2 port motorised zone valve supplied to interrupt the flow of primary water around the heat exchanger coil when the control temperature has been reached. The controls are located within the lower terminal housing along with the immersion heater thermostat. The thermostat is factory set to give a water storage temperature of approx. 55°C to 60°C. Access to the thermostat can be made by opening the terminal housing cover - DISCONNECT THE ELECTRICAL SUPPLY BEFORE OPENING THE COVER. Temperature adjustment is made by inserting a flat bladed screwdriver in the adjustment knob and rotating. The minimum thermostat setting is 12°C. The adjustment range 1 to 5 represents a temperature range of 12°C to 68°C (60°C will be approximately position 4). If in any doubt contact a competent electrician.

An immersion heater is also provided for use should the indirect heat source be shut down for any purpose. The immersion heater control temperature is set using the immersion heater thermostat.

DO NOT bypass the thermal cut-out(s) in any circumstances.

OPERATIONAL FAULTS

Operational faults and their possible causes are detailed in the Fault Finding section of this book. It is recommended that faults should be checked by a competent installer.

The air volume within the expansion vessel will periodically require recharging to ensure expanded water is accommodated within the unit. A discharge of water **INTERMITTENTLY** from the expansion valve will indicate the air volume has reduced to a point where it can no longer accommodate the expansion.

FAULT FINDING & SERVICING

IMPORTANT

- After servicing, complete the relevant Service Interval Record section of the Benchmark Checklist located on page 22 and 23 of this document.
- Servicing should only be carried out by competent persons in the installation and maintenance of unvented water heating systems.
- Any spare parts used MUST be authorised parts.
- Disconnect the electrical supply before removing any electrical equipment covers.
- NEVER bypass any thermal controls or operate system without the necessary safety valves.
- Water contained in the cylinder may be very hot, especially following a thermal control failure. Caution must be taken when drawing water from the unit.

SPARE PARTS

A full range of spare parts are available for the cylinder range (Table 5 Page 18). Refer to the technical data label on the unit to identify the model installed and ensure the correct part is ordered. You will need to quote the serial number, which is printed on the data label.

FAULT FINDING

The fault finding chart (Table 4 Page 17) will enable operational faults to be identified and their possible causes rectified. Any work carried out on the cylinder unvented water heater and its associated controls MUST be carried out by a competent installer for unvented water heating systems. In case of doubt contact service support (see contact details on back page).

WARNING

DO NOT TAMPER WITH ANY OF THE SAFETY VALVES OR CONTROLS SUPPLIED WITH THE CYLINDER AS THIS WILL INVALIDATE ANY GUARANTEE.

Fault	Possible Cause	Remedy
No hot water flow	Mains supply off	Check and open stop cock
	Strainer blocked	Turn off water supply. Remove strainer and clean
	Cold water combination valve incorrectly fitted	Check and refit as required
Water from hot tap is cold	Direct immersion heater not switched on	Check and switch on
	Direct immersion heater thermal cut-out has operated	Check, reset by pushing button on thermostat
	Indirect programmer set to central heating only	Check, set to domestic hot water programme
	Indirect boiler not working	Check boiler operation. If fault is suspected consult boiler manufacturer's instructions
	Indirect thermal cut-out has operated	Check, reset by pushing button on thermostat Check operation of indirect thermostat
	Indirect motorised valve not connected correctly	Check wiring and/or plumbing connections to motorised valve
Water discharges from expansion valve	INTERMITTENTLY Expansion vessel charge pressure has reduced below 3.5bar, or set to high	See Maintenance section for re-charging of expansion vessel procedure
	CONTINUALLY cold water combination valve pressure reducer not working correctly. Expansion valve seat damaged	Check pressure from cold water combination valve. If greater than 3.5bar replace pressure reducing valve Remove expansion valve cartridge, check condition of seat. If necessary fit new expansion valve
Water discharges from T&P relief valve	Thermal control failure **NOTE: water will be very hot**	Switch off power to immersion heater(s) and shut down boiler. **DO NOT** turn off water supply. When discharge stops check all thermal controls, replace if faulty
Milky water	Oxygenated water	Water from a pressurised system releases oxygen bubbles when flowing. The milkiness will disappear after a short while

Table 4: Fault Finding Chart

SPARES

Item Number	Description	Part Number
1	Immersion heater (Bent)	95 606 984
2	Immersion heater (Straight)	95 606 986
3	Solar pocket plate assembly	95 607 064
4	Blanking plate assembly	95 605 881
5	Immersion heater gasket	95 611 822
6	Immersion heater backnut	95 607 869
7	Immersion heater key spanner	95 607 861
8	Indirect thermostat & thermal cut-out	95 612 716
9	Direct thermostat & thermal cut-out	95 612 717
10	Solar thermal cut-out	95 612 698
11	6 Way terminal block	95 607 933
12	3 Way terminal block	95 607 932
13	Terminal cover	95 614 095
14	Temperature / Pressure relief valve	95 605 810
15	Tundish	95 605 838
16	Expansion valve - complete - 0.6MPa (6 Bar)	95 607 030
17	Cold water combination valve - complete	95 605 047
18	Motorised 2 port valve	95 605 049
19	Accessory Kit - Indirect (without expansion vessel)	95 607 968
20	Accessory Kit - Direct (without expansion vessel)	95 607 969
21	Expansion vessel - 12 litre (120 & 150 litre models)	95 607 863
22	Expansion vessel - 18 litre (170 & 210 litre models)	95 607 864
23	Expansion vessel - 24 litre (250 & 300 litre models)	95 607 612

Table 5: Spares

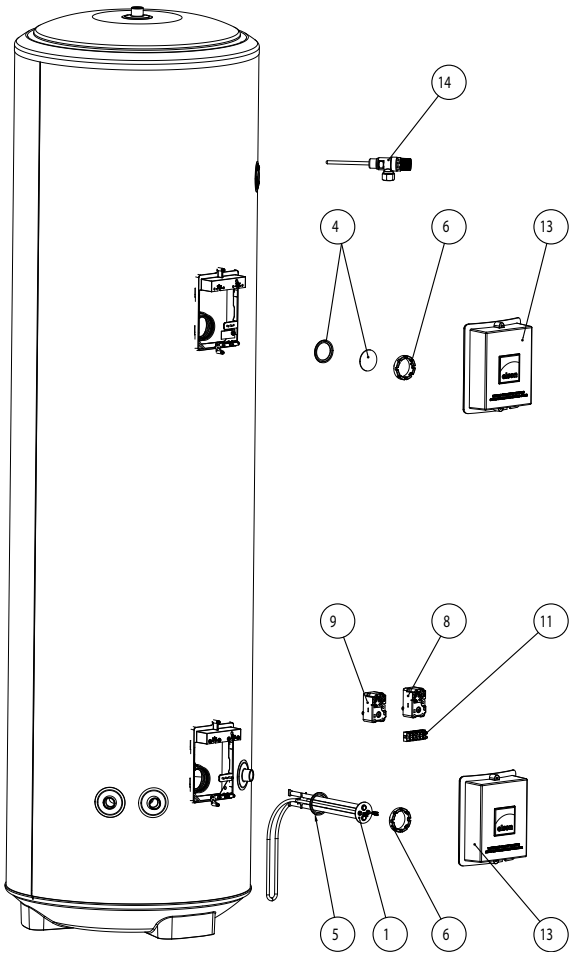


Fig. 11: Indirect Cylinder Spares Diagram

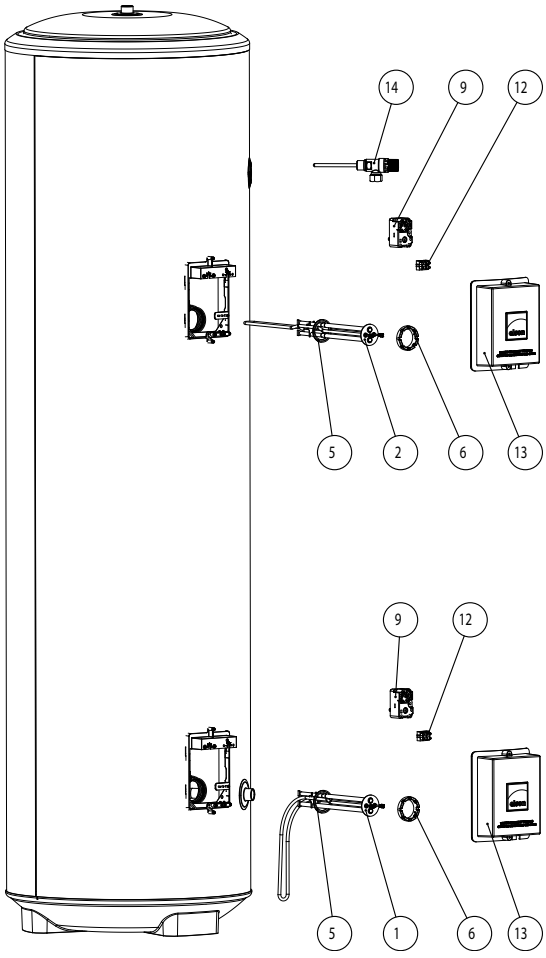


Fig. 12: Direct Cylinder Spares Diagram

HEAT LOSS

Nominal Capacity (Litres)	Standing Heat Loss	
	per day (kWh/24h)	per year (kWh/365d)
120	1.47	537
150	1.70	621
170	1.92	701
210	2.10	767
250	2.22	811
300	2.52	920

Table 6: Standing heat losses (based on an ambient air temperature of 20°C and a stored water temperature of 65°C)

ENVIRONMENTAL

Products are manufactured from many recyclable materials. At the end of their useful life they should be disposed of at a Local Authority Recycling Centre in order to realise the full environmental benefits.

Insulation is by means of an approved CFC/HCFC free polyurethane foam with an ozone depletion factor of zero.

NOTES

NOTES

MAINS PRESSURE HOT WATER STORAGE SYSTEM COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the storage system as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty but does not affect statutory rights.

Customer Name _____ Telephone Number _____

Address _____

Cylinder Make and Model _____

Cylinder Serial Number

Commissioned by *(print name)* _____ Registered Operative ID Number _____

Company Name _____ Telephone Number _____

Company Address _____

_____ Commissioning Date _____

To be completed by the customer on receipt of a Building Regulations Compliance Certificate*:

Building Regulations Notification Number *(if applicable)* _____

ALL SYSTEMS PRIMARY SETTINGS (indirect heating only)

Is the primary circuit a sealed or open vented system?	Sealed ☐	Open ☐	
What is the maximum primary flow temperature?			°C

ALL SYSTEMS

What is the incoming static cold water pressure at the inlet to the system?				bar
Has a strainer been cleaned of installation debris (if fitted)?	Yes ☐	No ☐		
Is the installation in a hard water area (above 200ppm)?	Yes ☐	No ☐		
If yes, has a water scale reducer been fitted?	Yes ☐	No ☐		
What type of scale reducer has been fitted?				
What is the hot water thermostat set temperature?				°C
What is the maximum hot water flow rate at set thermostat temperature (measured at high flow outlet)?				l/min
Time and temperature controls have been fitted in compliance with Part L of the Building Regulations?			Yes ☐	
Type of control system (if applicable)	Y Plan ☐	S Plan ☐	Other ☐	
Is the cylinder solar (or other renewable) compatible?	Yes ☐	No ☐		
What is the hot water temperature at the nearest outlet?				°C
All appropriate pipes have been insulated up to 1 metre or the point where they become concealed			Yes ☐	

UNVENTED SYSTEMS ONLY

Where is the pressure reducing valve situated (if fitted)?				
What is the pressure reducing valve setting?				bar
Has a combined temperature and pressure relief valve and expansion valve been fitted and discharge tested?	Yes ☐	No ☐		
The tundish and discharge pipework have been connected and terminated to Part G of the Building Regulations			Yes ☐	
Are all energy sources fitted with a cut out device?	Yes ☐	No ☐		
Has the expansion vessel or internal air space been checked?	Yes ☐	No ☐		

THERMAL STORES ONLY

What store temperature is achievable?		°C
What is the maximum hot water temperature?		°C

ALL INSTALLATIONS

The hot water system complies with the appropriate Building Regulations	Yes ☐
The system has been installed and commissioned in accordance with the manufacturer's instructions	Yes ☐
The system controls have been demonstrated to and understood by the customer	Yes ☐
The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer	Yes ☐

Commissioning Engineer's Signature _____

Customer's Signature _____

(To confirm satisfactory demonstration and receipt of manufacturer's literature)

*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

benchmark COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

©Heating and Hotwater Industry Council (HHIC)

SERVICE RECORD

It is recommended that your hot water system is serviced regularly and that the appropriate Service Record is completed.

Service Provider
Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

SERVICE 1 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 2 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 3 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 4 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 5 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 6 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 7 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 8 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 9 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 10 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

Sales & Support

Guarantee

On site service support including parts and labour for 12 months from date of installation. After the initial 12 months, a guarantee will apply for a further 24 years for the stainless steel inner vessel only. During this 24 year period, in the event of a cylinder leak, a replacement product will be issued provided that the replacement is carried out by one of our heateam engineers, for which reasonable labour charges will apply.

The guarantee is valid provided that:

- It has been correctly installed as per the instructions contained in the instruction manual and all relevant Codes of Practice and Regulations in force at the time of installation.
- The Benchmark Checklist has been completed upon commissioning and the Benchmark Service Record is completed for each service.
- It has not been modified in any way, other than by ELSON.
- It has not been frost damaged.
- It has only been used for the storage of potable water.
- It has not been tampered with or been subjected to misuse or neglect.
- The fault is not scale related.
- Within 60 days of installation the user completes and returns the certificate supplied along with the proof of purchase to register the product.
- It has been installed in the United Kingdom.
- The fault is not caused by high chloride levels in the water supply or incorrect disinfection methods.

Evidence of purchase and date of supply may be required. The guarantee is transferable. This guarantee does not affect your statutory rights.

Servicing

heateam

heateam is Elson's very own service division. With us on your side, you can be sure that your customers are in the very best of hands. Totally committed to quality and safety, heateam is open 7 days a week, for 363 days a year, and offers:

- **Dedicated Trade Advice Line** - our helpful and qualified specialists are always on hand to help you with even the most complex technical query.
- **Installer Priority Call-Outs** - our 280 strong team of specifically trained expert heating engineers covers the UK, no one is better qualified to look after Elson's products for the duration of the guarantee.
- **Fully Stocked Vans** - a nationwide fleet of vans, fully stocked with spare parts - meaning we can repair our appliances on the first visit 95% of call-outs.
- **Exclusive Service Plans** - heateam also offer Elson's customers a range of exclusive annual service plans.

Opening Times: Monday-Friday 8am-6pm, weekends and Bank Holidays* 8.30am-2pm.

*excluding Christmas Day and New Year's Day.

Simply call **0844 3358819** or visit our website at **www.heateam.co.uk**

Spares

For all technical support, replacement parts & service issues please contact:

Electric Water Heating Co.
2 Horsecroft Place, Pinnacles,
Harlow, Essex CM19 5BT
Tel: 0845 0553811
E-mail: sales@ewh.co.uk

SPD
Special Product Division, Units 9 & 10
Hexagon Business Centre,
Springfield Road,
Hayes, Middlesex UB4 0TY
Tel: 020 8606 3567

Parts Center
Tel: 0845 270 9800
www.partscenter.co.uk

Newey & Eyre
Specialists Products Division
Please contact your local branch

UK Spares Ltd
Tower Lane, Warmley,
Bristol BS30 8XT
Tel: 0117 961 6670
www.uk-spares.com

Advanced Water Company Ltd
Unit 5D, Enterprise Way, Vale Park,
Evesham, Worcestershire WR11 1GS
Tel: 01386 760 066

Policy Statement

The policy of ELSON is one of continuous product development and, as such, we reserve the right to change specifications without notice.

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